REMARKS/ARGUMENTS

Prior to this response, claims 1, 3, 5-11, 14, 16-18, 21-26, 31, 36-39, and 41-80 were pending in the application.

Independent claim 1 is amended to correct a typographical error, and dependent claim 39 is amended to address an antecedent basis issue.

After entry of the Amendment, claims 1, 3, 5-11, 14, 16-18, 21-26, 31, 36-39, and 41-80 remain for consideration by the Examiner.

Claim Rejections Under 35 U.S.C. §112

In the Office Action, claim 39 was rejected for indefiniteness because of a lack of antecedent basis. Claim 39 is amended to address this issue.

Claim Rejections Under 35 U.S.C. §103

In the Office Action, claims 1, 5-11, 13 (but, likely, the Examiner intended claim 14), 17, 21-26, 31, 36-39, 41-80 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Publication No. 2002/0049845 ("Sreenivasan") in view of U.S. Patent Publication No. 2003/0005356 ("Franckowiak'). This rejection is traversed based on the following remarks.

As stated in the last response, the invention is directed to methods and systems configured to provide better control over transitions in a highly available network or cluster environment. Centralized or cluster system services (such as those provided on a master node and backed up on vice node) are used to provide and manage the cluster environment, and according to one feature of the invention, these cluster system services themselves are highly available. The cluster system services are also interdependent in that the servers on the master node preferably coordinate their actions relative to the state of other servers during system transitions.

Hence, the claims are directed to mechanisms and methods to coordinate the servers of centralized or cluster system services during system transitions, such as during node initialization, node shutdown, switchover of the master node, and

failover of the master node. The coordinate mechanism is provided at least in part by a local cluster system service coordinator (CSSC) server provided on each node of the cluster that communicates with CSSC on other nodes. The CSSC communicates with local servers that register with it via an API. The CSSC coordinates the actions of the servers by invoking callback functions registered by the servers at different stages during system transitions. Sreenivasan, which is mainly directed toward improving the maintenance membership in a high availability system, fails to show the claimed features of this transition mechanism and method, and Applicants request the rejection based on this reference be withdrawn.

More particularly, claim 1 is directed to a network with a master node including a primary server that runs a centralized system service. This service includes a cluster membership monitor that manages membership of a set of a plurality of nodes in the network in a cluster. To provide redundancy or high availability not only of the distributed services provided by the cluster nodes but also of the cluster itself, a vice node is provided that is able to run the centralized system service when the master node is unable or unavailable. System services coordinators are provided on each node in the cluster, and significantly, operates to coordinate, such as on the master node, "a function defining an operational transition in the cluster and regarding said centralized system service." To facilitate improved transition coordination, the centralized service registers callback actions with the system services coordinator, and the coordinator then processes these callback actions as part of the function coordination.

Sreenivasan is cited in the Office Action at paragraphs [0015, 0037, 0078, 0079, 0081, and 0083] with reference to Figure 1 (items 12, 32, and 34) for teaching each element of claim 1. Further, Applicants disagree that Sreenivasan's "N2 (backup)" teaches the vice node that is configured to run the centralized system service, which not only is defined as comprising a cluster membership monitor but also of acting to register "callback actions with said system services coordinator."

Paragraph [0083] discusses a "register/unregister interface an application may chose [sic] to receive asynchronous notifications when the Server detects changes in the status of the nodes in the cluster." However, this does not teach registering callback actions with a system services coordinator for its use in coordinating an operation transition function. For these reasons, Sreenivasan does not teach or suggest each element of claim 1.

The Office Action agreed with this characterization of Sreenivasan in para. 10 on page 5 when it stated that this reference "does not explicitly disclose registering callback actions with said system services coordinator and wherein said system services coordinator processes the registers callback actions for said centralized system service as part of the function coordinated by the system services coordinator." The Office Action then cites Franckowiak for disclosing this feature that is missing in Sreenivasan at Figure 6, item 82 with reference to paragraphs [0002], [0029], and [0053]. However, Franckowiak teaches an application registering callback functions, such as an "application transport send function", with a "Data Marking Library" or DML. The DML "is a general purpose system and method supporting replication of global application data between an active and standby process" (see, para. [0029].

At these citations and elsewhere, it can be seen that Franckowiak teaches how best to provide changed data from an active to a standby application. There is no teaching in Franckowiak that the DML is a services coordinator that coordinates performance of a function "defining an operational transition" or that it may be useful to register callback actions with such a coordinator for later processing to coordinate performance of the function among the centralized system services on a plurality of nodes as called for in claim 1. Instead, Franckowiak merely teaches registering a callback function with a data replication service to facilitate data replication. Applicant is not attempting to claim the mere use of a callback function or action but is instead, in claim 1, claiming the registering of callback actions with a

system services coordinator by a plurality of centralized system services running on a plurality of nodes that are later processed by the system services coordinator to coordinate performance of a function "defining an operational transition". Hence, Franckowiak fails to overcome the deficiencies of Sreenivasan noted both by Applicants and by the Examiner.

The Applicants would also like to point out that the Office Action incorrectly asserts that Sreenivasan discloses utilizing callback actions at paragraph [0134] including the actions of "elect, compute, distribute, remove nodes, etc". In this paragraph, Sreenivasan is discussing its techniques for forming a new membership including performing an election. There is no mention here of using callback actions to form the new membership (let alone that such callback actions are registered by centralized system services on a plurality nodes with a system services coordinator for later performance of a transition defining function). For this additional reason, the combination of Sreenivasan and Franckowiak would not result in the claimed invention and the rejection should be withdrawn as not properly supported by the references.

Claims 5-11 depend from claim 1 and are believed allowable as depending from an allowable base claim. Further, claims 5-10 list specific transition defining functions that are performed using the registered callback functions. Since Sreenivasan fails to teach the use of callback functions, it also fails to teach the use of callback functions to perform specific functions as called for in these claims. Franckowiak teaches the use of registered callback actions but fails to teach callback actions for performing these specific transition defining functions, and this would be expected as Franckowiak is directed toward providing more effective data replication. For these additional reasons, claims 5-10 are believed allowable over the combined teaching of these two references.

Regarding independent claim 14, the claimed node includes a high availability level and an operating system level and system service coordinator residing on the high availability level and a centralized system service (i.e., on that includes a mechanism for monitoring membership in a cluster) at least partially residing in the operating system level. Sreenivasan fails to teach a node configured in this manner. In paragraph [0080] to [0110], Sreenivasan describes its cluster membership services, and in this description, there is no suggestion of nodes having two levels in which a centralized system service and a system services coordinator reside.

The Response to Arguments argues that Sreenivasan does teach such a node at paragraphs [0070] and [0232] with the GCS and CMS being on different layers. In these paragraphs, Sreenivasan discusses layers in passing but does not teach or suggest the use of a high availability layer or level and an operating system layer/level (see, for example, paragraph [0070] where Sreenivasan states "a single-server application layered on top of multi-server highly available system services.") There is no teaching of the claimed levels in the primary node or of the specific placement in such levels of the system services coordinator and the centralized system service. For this reason, claim 14 is not shown or suggested by Sreenivasan.

Further, claim 14 calls for the system services coordinator to coordinate a transitional function regarding the centralized system service, and significantly, the function includes a callback sequence that is used by the coordinator in performance of the function including transition to an appropriate availability state. Applicants could find no teaching of these features of claim 14 in Sreenivasan (as is discussed with reference to claim 1). Hence, Sreenivasan does not support an anticipation or an obviousness rejection of claim 14 (note, Applicants believe the addition of Franckowiak as applied to claim 1 would not overcome the deficiencies of Sreenivasan for the reasons provided with reference to claim 1 and also,

because Franckowiak fails to teach a node with the levels discussed above or the placement of particular components in such levels).

Claims 17 and 21-26 depend from claim 14 and are believed allowable as depending from an allowable base claim. Additionally, claims 21-26 include limitations similar to those provided in claims 5-10, and the reasons provided for allowing claims 5-10 over the combined teaching of Sreenivasan and Franckowiak are believed relevant and applicable to claims 21-26.

Independent claim 31 is directed to a method for coordinating a system service that includes a cluster membership monitor for managing a cluster of nodes. The method includes registering a callback sequence with a system services coordinator on a master node and using the callback sequence to perform a function including invoking callback functions having levels correlating to completing stages of the functions. During the method, the levels are received at the system services coordinator as they are completed.

In the Office Action, paragraphs {0032, 0085, 0086, 0087, 0088, 0091, 0092, 0112, and 0116] are cited for teaching the use of callback functions that are registered to coordinate performance of the function and that such callback functions may have levels or to at least make such features obvious to one skilled in the art. Applicants have studied these cited paragraphs but disagree that the method of claim 31 would be obvious. There is no teaching in Sreenivasan for registering and using a callback sequence with a systems services coordinator to coordinate performance of a function. For this reason, Sreenivasan does not support an obviousness rejection of claim 31.

The Office Action states that Sreenivasan fails to teach utilizing callback actions and cites Franckowiak in an attempt to overcome this failing, but the Office Action states that based on Sreenivasan it would have been obvious to use a callback sequence for performing functions. Applicants disagree. Applicants first argue that the combined teaching of Sreenivasan and Franckowiak fail to teach the

method of claim 31 for the reasons provided for allowing claim 1. Second, Applicants argue that Franckowiak fails to teach using a callback sequence but instead only teaches registering a callback action and not that the actions have to be performed in a sequence.

Yet further, claim 31 requires that callback functions have "levels, said levels correlating to completing states of said callback functions" and includes "receiving said levels at said system services coordinator as said stages are completed." The Office Action cites Sreenivasan at paragraphs 0085-0088, 0143, and 0182 for teaching these limitations. However, Applicants could find no teaching of the use of callback functions let alone such functions including levels and receiving the levels at the completion of various stages of the callback functions. For example, in paragraph [0085], Sreenivasan discusses its "CMS" communicating with each other but fails to provide any discussion whatsoever of a callback function with levels correlating to completing stages of a callback function or receiving levels upon such stage completion. At paragraph [0143], Sreenivasan discusses the adding of a new node to a group membership, but this appears to have nothing to do with the use of callback functions having levels correlating to completion of stages or tracking such staged completion. For these additional reasons, claim 14 is believed allowable over Sreenivasan, and Franckowiak is not cited for (and would not be useful in) overcoming these deficiencies or lack of teaching found in the primary reference.

Claims 36-39, 41-46 and 52-80 depend from claim 31 and are believed allowable as depending from an allowable base claim. Further, these claims provide specific functions that may coordinated with the callback sequence, and these additional limitations are not shown or suggested by Sreenivasan or Franckowiak.

Independent claim 47 is directed to a method for coordinating initialization in a network and includes the use of registered callbacks in a way similar to that called for in claim 1 and hence, the reasons for allowing claim 1 over Sreenivasan and Franckowiak are believed applicable to claim 47. Further, claim 47 calls for the registered callbacks to trigger initialization levels at the plurality of nodes in the network, which is similar to limitations provided in claim 31. Hence, the reasons provided above for allowing claim 31 over Sreenivasan and Franckowiak are believed applicable to claim 47. Claims 48-51 depend from claim 47 and are believed allowable as depending from an allowable base claim.

Additionally, in the Office Action, claims 3 and 18 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sreenivasan in view of U.S. Patent Publication No. 2002/0152373 ("Sun"). This rejection is traversed because claims 3 and 18 depend from claims 1 and 14, respectfully, and as explained above, claims 1 and 14 are not taught or suggested by Sreenivasan. Sun at the cited paragraphs [0060 and 0071] and elsewhere fails to overcome the deficiencies of Sreenivasan with regard to claims 1 and 14. Hence, claims 3 and 18 are believed allowable as depending from allowable base claims

Still further, in the Office Action, claim 16 was rejected under 35 U.S.C. §103(a) as being unpatentable over Sreenivasan in view of U.S. Patent No. 6,415,323 ("McCanne"). This rejection is traversed because claim 16 depends from claim 14, which is believed in condition for allowance, and McCanne does not overcome the deficiencies of Sreenivasan discussed above with reference to claim 14. Hence, claim 16 is believed allowable as depending from an allowable base claim.

Yet further, in the Office Action, claims 1 and 5-11 were rejected under 35 U.S.C. §103(a) as being unpatentable over newly cited U.S. Patent Publication No. 2005/0071470 ("O'Brien") in view of Franckowiak. This rejection is traversed based on the following remarks.

The Office Action cites O'Brien at paragraphs [0128] and [0129] for teaching the system services coordinator on each of the plurality of nodes coordinating a function defining an operational transition in the cluster **and** regarding said centralized system service running on a primary server. Applicants disagree. These paragraphs discuss a management component that may be local to a resource and/or local to an availability manager. There is no teaching that such a management component coordinates a function defining a transition in the cluster or that the function has anything to do with a centralized system service. Hence, O'Brien fails to teach the system services coordinator of claim 1.

The Office Action notes that O'Brien as with Sreenivasan fails to teach that the management component registers callback actions and then processing such registered callback actions to coordinate the function for the centralized system service. The Office Action again cites Franckowiak for teaching the use of callback actions. As discussed with the combined teaching of Sreenivasan and Franckowiak with reference to claim 1, Franckowiak fails to overcome the deficiencies of O'Brien in that it fails to teach that callback actions are registered for a centralized system service and then processed by the system services coordinator to coordinate performance of function in the network. As a result, the combination of these two references fails to support an obviousness rejection of claim 1.

Claims 5-11 depend from claim 1 and are believed allowable as depending from an allowable base claim. Further, claims 5-10 list specific transition defining functions that are performed using the registered callback functions. Since O'Brien fails to teach the use of callback functions, it also fails to teach the use of callback functions to perform specific functions as called for in these claims. Franckowiak teaches the use of registered callback actions but fails to teach callback actions for performing these specific transition defining functions. For these additional reasons, claims 5-10 are believed allowable over the combined teaching of these two references.

Conclusions

In view of all of the above, Applicants request that a timely Notice of Allowance be issued in this case.

No fee is believed due for this submittal. However, any fee deficiency associated with this submittal may be charged to Deposit Account No. 50-1123.

Respectfully submitted,

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